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PROFESSOR OF THE ANATOMY AND PHYSIOLOGY OF THE NERVOUS SYSTEM IN THE NEW YORK POST-GRADUATE MEDICAL SCHOOL AND HOSPITAL, AND OF NERVOUS AND MENTAL DISEASES IN THE MEDICAL DEPARTMENT OF THE UNIVERSITY OF VERMONT.

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Following the exhibition of a series of photographs of cases which have been shown this evening, it seems to me that little needs to be said in confirmation of the views advanced by Dr. Stevens. These photographs are so startling that they would be accepted, in my opinion, in any court of justice by an unprejudiced jury, as proof that unmistakable benefits had been derived from the treatment. They are from untouched negatives, made with no collusion between the patient and the doctor, or the doctor and the photographer. They tell their own story in a simple way, which needs no comment from me. I have personally seen and examined several of these cases, and I consider the published histories as decidedly understated.

* This paper comprises the substance of my remarks made before the Neurological Society of New York, in the discussion which followed the paper prepared by Dr. George T. Stevens, of New York, entitled "Irritations arising from the Visual Apparatus considered as Elements in the Genesis of Neuroses," and read by invitation before that society, on March 1, 1887.

As I have been specially invited, both by the author of the paper and by your esteemed president, to give my views here this evening, it may not be inappropriate for me to state that I have performed the Stevens operation for the relief of ocular insufficiency nearly two hundred times, and have carefully observed the condition of refraction and accommodation, as well as that of the ocular muscles, in several hundred subjects afflicted with various forms of nervous diseases. In the tests made I have followed very closely the methods employed by the author of the paper of the evening.

I desire to say here that I do not pretend to speak as an oculist, but as a neurologist. I am not here to discuss the points that may be raised by the ophthalmologists present. I have simply learned (as every neurologist should do) the details of a method designed for the purpose of diagnosis and treatment of refractive and muscular anomalies, and I have uninterruptedly followed that method in nearly every case seen by me in my office for the past two years. I can here state that originally I was a skeptic. My skepticism, however, became no longer tenable when I saw a choreic and epileptic imbecile in Dr. Stevens's office, who was perfectly restored in a short time to health and mental sanity by the method described by the author of the paper of the evening.

I think this paper will tend to establish *a new era in neurology*. For the treatment of functional nervous disease I should feel myself unfitted to-day without my case of trial-glasses and prisms.

In reference to the *operation* described, I would remark that in no case have I observed any bad effects as the result of surgical interference, or complications which have caused me any anxiety. This line of treatment requires a careful regard for detail, accurate records of all obser-

vations made, and special skill derived from experience and close observation to insure satisfactory results. If properly followed, I know of no line of treatment which has yielded such startling results in functional nervous diseases. If employed by a novice, it is not hard to understand how serious difficulties might arise.

Respecting the view that the *eye* is an important factor in creating and prolonging the so-called "*neuropathic predisposition*," the following facts are pertinent:

1. No one has yet shown in what this predisposition lies; hence, if Dr. Stevens has shown that eye-defect is an important element in these conditions, a great advance has been made.
2. There is no recognized pathology in functional nervous diseases.
3. Heredity is very common in these affections. It is one of the most marked features in this class of nervous diseases.
4. My records (in common with those of Dr. Stevens) go to show that eye-defect is found in a very large proportion of such subjects.
5. Many of the eye-defects found can be shown to be congenital—being inherited, like other facial peculiarities.
6. The manifestations of the neuropathic predisposition vary with each case. They are called forth often by extremely trivial circumstances. These are too frequently regarded as of great clinical interest.

In the treatment of the *severer forms of functional nervous disease* (for example, in a typical case of chronic epilepsy), one radical cure without the aid of drugs offsets a thousand failures as a proof of the scientific value of a discovery. Let us see how the paper stands in this respect:

1. Radical cures of epilepsy have been reported. In

Dr. Stevens's experience seven patients have been free from epileptic seizures for more than five years, after tenotomy of the eye-muscles and without the aid of medication. Such a result can not be attributed by fair-minded critics to the effect of chance or accident.

2. Dr. Wise's report of the work in the Willard Asylum (with the light thrown upon it by Dr. Stevens) is a remarkable record. In spite of the cessation of the bromides and all medicinal treatment, in twelve cases of chronic epileptic insanity the attacks were decreased over seventy-five per cent. during the month following the operations. No unbiased person can fail to see the great disadvantages which existed in treating the hopeless cases of those whose answers could not be relied upon when tests were being made, and whose treatment was of necessity crude and incompleted (Dr. Stevens's stay being of very short duration). It must also be borne in mind that an incomplete relief of ocular tension, made under such disadvantageous circumstances, would naturally be liable to be followed by relapses. If one patient so treated made a perfect recovery, it is the strongest evidence in favor of the necessity for operation.
3. My own experience in the treatment of epilepsy by this method has yielded very satisfactory results.

I have taken from my own record-book the following abstract of cases of epilepsy, treated by me in private practice during the past year and a half. Total number of cases = sixteen. In only two were both eyes emmetropic; in nine, hyperopia or hyperopic astigmatism existed; in five, myopia or myopic astigmatism was found. In only one case was no defect in the eye-muscles found. Insufficiency of the interni (*exophoria*) was not detected in a single instance.

Esophoria and hyperphoria predominated. In nine, the mental powers were very markedly impaired. Of these sixteen patients, five refused operation; one was sent to an asylum; one, whose trouble was due to syphilis, recovered under specific treatment; one was too young to make the tests sufficiently reliable to warrant surgical interference; and eight were operated upon by me. Of these eight, three are apparently cured and five are still under treatment. Two have had no fits for over one year. One of these averaged at times as high as ten seizures in a day before I operated upon the eye-muscles. In every one of the five cases still under my observation the attacks have been lessened, in spite of the fact that no medication has been allowed since the date of the operation. One patient has granular kidneys, and the four others bid fair to improve still further, if not to recover entirely. Photographs of one of these are shown you to-night with permission. This young lady is well known to some of the medical gentlemen who are present. She has enjoyed from time to time the skillful services of many of the best neurologists and oculists in this city, who have done all that science could do for her, except to divide her interni and left inferior recti muscles. After ceasing the administration of bromides some two years ago, she had seventeen severe attacks in one night.

One case of *neurasthenia*, with mental symptoms closely bordering on insanity, was completely cured by me through the relief of a high degree of insufficiency of the externi and the correction of a latent hyperopia of about two dioptres. Another subject of neurasthenia, with recurring attacks of severe gastralgia, palpitation of the heart, and frequent symptoms of impending suffocation of sixteen years' standing, is to-day apparently cured by tenotomy of the externi. For many years she had not been able to spend evenings in company, or often with her immediate family, on account of

the excitement induced by so doing. She had more or less constant tremor, which immediately ceased after the operation.

In cases of *headache* and *neuralgia*, I have had some very remarkable results follow tenotomy of the eye-muscles. I have never yet encountered a case of typical migraine in which some form of eye-defect did not exist.

In *chorea*, I have found that hyperopia and muscular defect in the orbit existed in a very large proportion of the cases examined by me. The externi have been generally insufficient, or hyperphoria has existed in addition to a refractive error. The interni have never been defective in any case which has come under my personal observation, as far as I can recollect.

In *hysteria* and *hystero-epilepsy*, I have had some very satisfactory results from tenotomies performed upon the eye-muscles. One patient, who could with difficulty get across a room when unaided, walked three quarters of a mile soon after a hyperphoria was corrected by a tenotomy of the left inferior rectus, and a free division of both the externi was performed. At first she was carried each day to my office by hired assistants; to-day she walks daily up and down five flights of stairs, in addition to a walk of from ten to eighteen city blocks.

In summary, I would present the following conclusions as the result of uninterrupted investigations in this field for the past two years or more upon subjects afflicted with nervous diseases:

1. I believe that eye-defect constitutes a very important factor in the so-called "neuropathic predisposition." It is not pretended that it is present in all cases.
2. In neurology the importance of this line of investigation is particularly marked in the so-called "functional" diseases.

3. I am satisfied that "latent" insufficiency exists in many cases, as well as latent hyperopia, which is to-day generally recognized. There are many indisputable facts which confirm this proposition.
4. We have no means of accurately determining, in any given case, the exact amount of abnormal tension which needs correction, as we can do in the case of latent refractive errors by atropine.
5. I believe that tenotomy of the eye-muscles by the Stevens method is a safe and satisfactory way of relieving abnormal tension if practiced by competent experts.
6. Prisms will not meet the requirements of many cases. I regard them, at best, as but a temporary makeshift.
7. A tendency to vertical deviations of the visual axes is of great clinical importance in nervous diseases.
8. Tests for the determination of muscular errors should be made at a distance of twenty feet, in case operative procedures are to be based upon the error detected.
9. The attitude of the head of the patient should be carefully regarded while making these tests. A head-rest is of great value, in many cases, as an aid in making the tests.
10. Statistics show quite conclusively that the benefits derived from tenotomies performed upon the eye-muscles are permanent *when all errors are thoroughly rectified.* No case is to be considered as finally disposed of so long as muscular errors in the orbit are clearly shown to exist. If a relapse occurs, it is generally safe to presume that a renewed search will enable a competent observer to detect some errors which the patient did not exhibit when under observation.

The existence of "latent" insufficiency explains how such relapses may occur.

11. It can be shown that repeated tenotomies do not impair the normal functions of the eye-muscles when a proper interval is allowed to elapse for a firm union of the divided tendon to the globe.

12. I believe that a careful regard to the details of the Stevens method of examination and operation, a thorough knowledge of physiological optics, and a full record of the results of every examination made of a patient's eyes (combined with good common sense), will give equally good results in other competent hands as in those of its main supporters.

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